

Pollution Solution: Keeping our fresh water clean!

Grades: 3rd-8th

Goals: Identify sources of water pollution.

Discover the difficulties in cleaning polluted water.

Learn how natural ecosystems clean water.

Learn how little freshwater there actually is on Earth.

Brainstorm how individuals can help conserve & protect our freshwater.

Introduction

The Great Lakes hold 1/5 of the world's freshwater supply, that's a lot of water! If the Great Lakes were emptied over the United States, our entire country would be submerged under 9½ feet of water! In Michigan, it seems as if we have no shortage of freshwater. Most of us don't think twice about turning on the faucet, or flushing the toilet, or taking a shower. What does it take to get that water from say, Lake Michigan, to your sink? Where does the dirty water go? How does it get clean?

Program

First, demonstrate to your students how much water there is in the world by playing "Toss the Globe". Have students circle up in a large area. Toss a large blow-up ball of the earth around the circle. Each student that catches the ball must see where their RIGHT THUMB is touching, and shout either "WATER!" or "LAND!". Choose a helper (parent or student) to keep track of the results of the game on a clipboard. After many tosses (go for at least 50), tally up the results. Hopefully, your results should be around 75% water and 25% land, but there should always be more water marks than land marks.

So basically there is way more water than land on Earth. Here in Michigan, we are surrounded by lakes, *freshwater* lakes. Out of all the water in the world, how much of it is fresh water? Demonstrate the amount of freshwater using the following activity:

- ◆ Pour 10 cups of water into a clear container. Explain that this represents all of the water in the world.
- ◆ Take 1/3 cup of water out of the big container and pour it into a smaller container. Set it aside. This represents all of the freshwater in the world. Pour salt into the rest of the water in the large container to represent the oceans. What would happen if you drank this water? (dehydration, stomachache, etc.)
- ◆ Not all freshwater is accessible. Remove 6 tablespoons of water from the "freshwater container" and place in an ice cube tray. This represents the fresh water in the ice caps.
- ◆ Remove 1 teaspoon and set it aside. Place rocks into the remaining water to represent groundwater, which needs to be welled in order to be accessible.
- ◆ Describe how the remaining teaspoon represents the surface freshwater in the world (lakes, rivers, streams, puddles and wetlands).

- ◆ Explain that the Great Lakes only make up 3 drops of all the water on the planet! Use an eyedropper to place 3 drops of water in a student's hand.

One of the biggest threats to our freshwater supply is pollution. Have students brainstorm different types of water pollution (exhaust from vehicles, smokestacks, sewage leaks, motorboat leaks, oil spills, etc.). Use the following demonstration to show how pollution can affect a water supply:

- ◆ Fill a large, clear container with water (a 10-gallon aquarium works well) to represent a local water source. Make sure to name it!
- ◆ The following are some examples you can use as pollution sources:
 - *Green dye* *herbicides & pesticides*
 - *Yellow dye* *animal waste from farming*
 - *Vegetable oil* *leaking vehicles, spills, boats, etc.*
 - *Candy wrappers* *litter from humans*
- ◆ Use dramatic effect when polluting your water to demonstrate how harmful it can be to a water source!

Water is *not* a renewable resource. The amount of water that is here on earth always stays the same, more water is not being created anywhere. It may change forms (rain, snow, fog, evaporation, etc.) but the amount of water does not change. Once a water source is contaminated, say, for example, the lake you just polluted, can it be cleaned to the point where it is reusable? Most of the time, the answer is yes. Wastewater treatment plants use a variety of filters and chemicals to treat water that has gone down our drains. After an oil spill, special materials are released to absorb the oil.

Break students up into groups to create a water filter using a funnel, cotton balls, coffee filters, large rocks and small gravel. Depending on the age, give them some ideas as to what could be used to collect larger items, such as the litter. Or what would be best to absorb the "oil spill". Once the filters are constructed, place each funnel in a plastic cup (use solid color cups with a white interior if you can, like SOLO party cups). Write the group's name (or number) on the cup, and pour some of the dirty lake water in each cup. Allow the water to drain for 10-15 minutes.

While waiting for the filters to work, move to a different area (a wetland if possible) to discuss natural water filters. Nature has its own filtration system, wetlands. Not only do wetlands clean water, but they also provide many other needs for wildlife. Pass around the following items to the students, and see if they can come up with the metaphor regarding wetlands.

OBJECT

WETLAND FUNCTION

Sponge	absorbs excess water caused by runoff; retains moisture
Pillow	resting place for migratory birds
Hand mixer	mixes nutrients and oxygen into the water
Toy cradle or crib	provides a nursery that shelters, protects & feeds young wildlife
Sieve or strainer	strains silt and debris from water

Coffee filter	strains smaller impurities from water
Antacid tablets	neutralizes toxic substances
Cereal box	provides nutrient-rich foods for wildlife
Soap	helps cleanse the environment

Go back to your water filters and see which group has the cleanest water. Break apart each filter to see how it was constructed, comparing the “winner” with the “loser” to see how they differ.

End the program with a good ole water balloon toss, Earth Day style!

Have the student partner up, facing each other about 3 feet apart, in two rows. Explain to each group that the water balloon represents their lake (or river, stream, pond, etc.). Their job is to protect their water source from the dangers of pollution by *not* dropping it. Make sure they name their water source! You are going to give a scenario, which will either be good for their lake, or bad. If it’s good, they take one step toward each other. If it’s bad, they take one step away from each other. After they take a step, you say “1, 2, 3, TOSS!” The last pair to keep their water source safe wins! Here are a few example scenarios, but use your imagination!

- ◆ A local fishing derby removes all of the big fish from your lake.
- ◆ A few jet skiers have old jet skis that leak oil into your lake.
- ◆ The local Boy Scout Troop has a trash clean-up around your lake.
- ◆ A developer decides that your lake would be a great place to build some new condos.
- ◆ Zebra mussels are found washed up on the shoreline, a sure sign these guys are present in your lake.
- ◆ A conservation officer catches someone releasing their pet piranhas into your lake.